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ABSTRACT

Summarizing the beginning of the second year of operation of the hatchery and educational program provided by the Applied Fisheries Science Program at Sheldon Jackson College in Sitka, Alaska for Alaska Natives and non-Native groups interested in salmon ranching, this fifth semi-annual report covers the period July 1 through December 31, 1976 and presents the following: Background (program objectives, advisory committee, and program staff); Program Progress (planning and coordination of educational programs, the Sea Grant Program, student recruitment and publicity, and funding sources); Academic Program; Advisory Services; Aquaculture Facilities (spring fry release and summer work in experimental incubators, sea water lab, and fry rearing); Fall Operations (Starrigavan Creek, Katlian River, Nakwasina River, Indian River, Hydroelectric Tailrace, 1976 Egg Take, and personnel); Future Hatchery and Academic Plans; Appendices. Major accomplishments reported here include: provision of two new teaching staff via a Sea Grant award; construction of the sea lab to be completed during spring semester; publications of "Aquaculture Newsletter" (disseminated to all Alaska high schools); student requests for maximum hands-on experience; finalization of the certification process for spring students. (JC)

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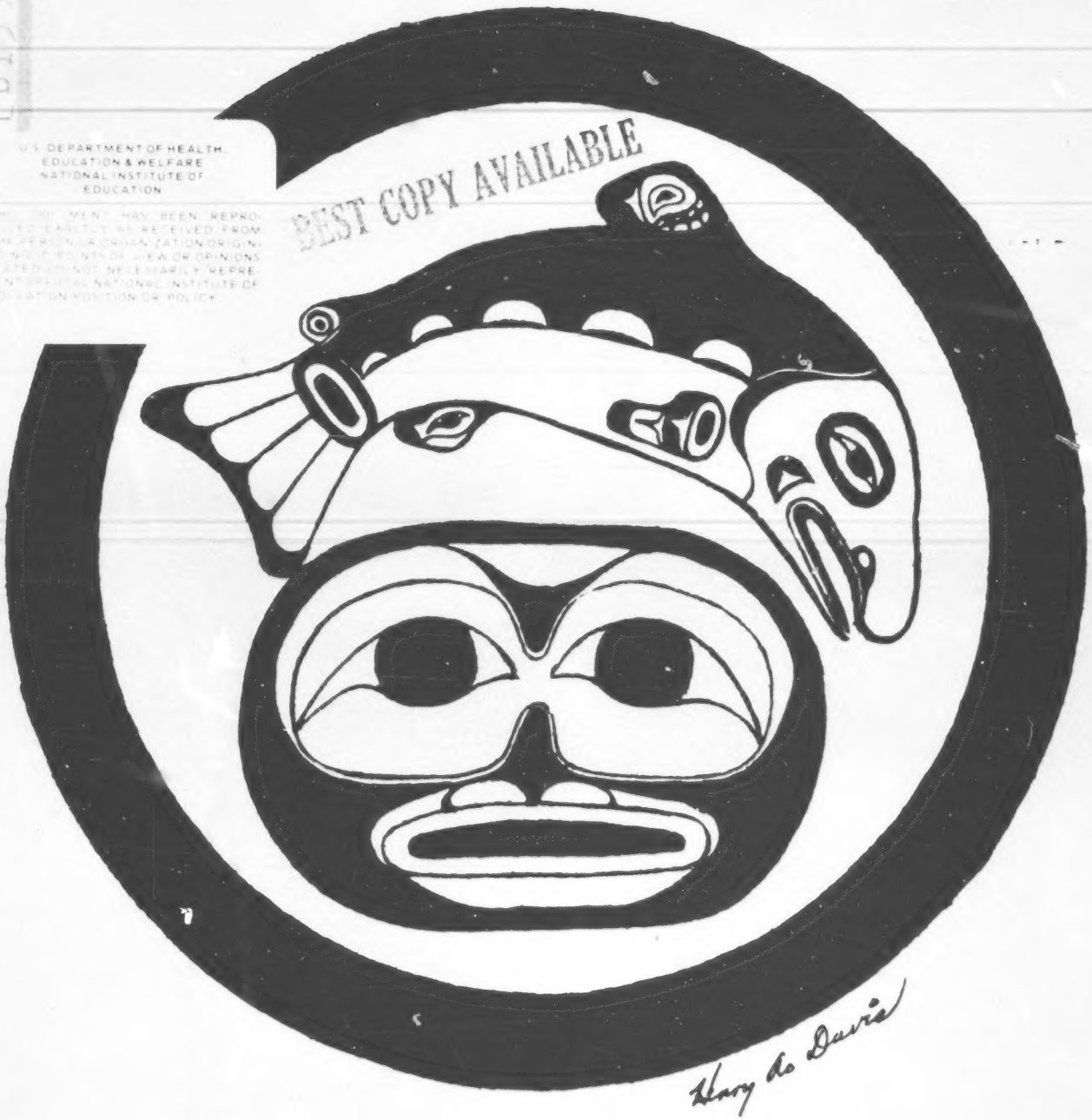

SHELDON JACKSON COLLEGE FISHERIES PROGRAM

RC006912

DEVELOPMENT OF AN APPLIED FISHERIES SCIENCE PROGRAM FOR NATIVE ALASKANS AT SHELDON JACKSON COLLEGE

FIFTH PROGRESS REPORT

1 February 1977

Submitted by

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Not for publication

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REPORT SUMMARY

1. The SJC Hatchery Technician Training Program is going forward in the belief that salmon enhancement in Alaska is progressing through a normal and healthy state of development.

2. Primary program objectives remain as originally formulated: to promote Native Alaskan education and enhance salmon stocks for self-sustaining funds and the common property fishery.

3. A Sea Grant award enabled the addition of two new teaching staff, Mack Cook and Gabriel George.

4. Sea lab construction is continuing on schedule and should be completed during spring semester.

5. A new instrument for student recruitment and publicity was initiated with the monthly publication of the Aquaculture Newsletter sent to all Alaska high schools.

6. Students emphasized their desire for maximum hands-on experience. Of 19 who registered for hatchery technician training, 11 were able to participate in pre-semester salmon spawning and reported it as one of their most valuable training periods.

7. An additional instructor will enable the inclusion of more materials in a third semester of Fish Husbandry, particularly in the areas of fish nutrition and disease.

8. A certification process is being finalized for application this spring to students who have satisfactorily completed the program requirements.

9. Approximately 2 million pink, 200,000 chum and 20,00 coho salmon eggs were taken in the fall of 1976.

10. Hatchery expansion plans are being finalized and have begun to increase egg incubation capacity from 2 to 12 million and provide short term fry rearing capability.

11. Work continues on long range plans for salmon enhancement, harvesting, and marketing, student employment and other functions necessary for the attainment of program objectives.

INTRODUCTION

The Northwest Area Foundation in 1974 provided Sheldon Jackson College with a two-year grant to develop and establish an Applied Fisheries Science Program designed for the needs of Alaska Native and non-Native groups wishing to participate in salmon ranching. In 1976, after determination of satisfactory progress and assessment of future needs pertinent to the achievement of a self-sustaining program, a second two-year grant was provided by the Northwest Area Foundation and initial funding for the first of three years additional educational development was awarded by the Alaska Sea Grant Program. Previous semi-annual reports documented the establishment and progress of the hatchery and educational programs under the Northwest Area Foundation grant. This, the fifth semi-annual report of the Sheldon Jackson College Aquaculture Program, covers the period July 1 through December 31, 1976, and summarizes the beginning of the second year of operation of the hatchery and the educational program. Since an annual hatchery report is required by the Alaska Dept. of Fish and Game each June, this report will be general, whereas the June report will be more detailed in terms of hatchery operation.

BACKGROUND

The development of the Sheldon Jackson College Aquaculture Program in anticipation of and on a continuing basis, in response to the extensive private and public salmon rehabilitation efforts has been recorded in the four earlier progress reports. During the past six months, it may have appeared at times to some participants and observers that salmon aquaculture efforts have slowed down after an exuberant beginning, especially in the private, non-profit sector. However, if true, this is to be

expected and should not be looked upon at this time as any indication of waning interest in salmon rehabilitation. On the contrary, it was inevitable that a program embarking on the massive goal of enhancing salmon populations for all Alaska and employing a new concept of private aid in doing so, would evolve through a period of wanting to get started quickly into a period of reality of how to do it in an organized way and find the finances with which to do it.

As we approach the end of the first two years of private non-profit hatchery participation in Alaska salmon enhancement, there are still many questions to which the answers may well determine the continuing or beginning involvement of the private sector in this program. Issues yet to be resolved include initial financing of private hatcheries, mangagement of returning hatchery fish relative to natural stocks, harvesting of hatchery stocks relative to common property fisheries, relationships of regional and individual private hatchery corporations, government requirements for hatchery permits on public land, extent of participation of commercial fishermen in the private non-profit program.

There are small problems of a technical nature but those listed above are probably at present the most crucial to the success of private involvement in the salmon rehabilitation program. As would be expected, they are also the most complex because they involve socio-political as well as economic problems or potential problems.

In the public sector, the voters in November of 1976, endorsed the $29 million bond issue for financing expanded salmon rehabilitation efforts of the Alaska Dept. of Fish and Game (ADF&G) including several new hatcheries. ADF&G has recently completed a draft of a fisheries management plan which will be used as a state guideline in organizing efforts and setting goals for the

future salmon enhancement and management of Alaska's fisheries. Copies will be made available for public input. Our new National Fisheries Management Act, that is, the 200 Mile Limit, goes into effect March 1, 1977. Already private industry with government encouragement is working on the development of a bottom fish industry for Alaskans. This has potentially positive biological as well as economic ramifacations for salmon fishermen and producers. In the private sector, commercial fishermen in Prince William Sound have indicated strong support of the private regional hatchery there by voluntary assessment of their own commercially caught salmon to help finance the hatchery. Over 90% of the commercial fishermen participating in the 1976 fishery in Prince William Sound joined the support program. Similar means of fishermen input, support, and active participation have yet to be worked out for Southeast Alaska, as the fishery there is more complex in terms of geographic diversity and more user groups. The Prince William Sound Aquaculture Corporation (PWSAC) experience of the past two years certainly indicates that commercial fishermen participation is fundamental to the success of private, non-profit hatcheries.

Six private non-profit hatchery permits have been issued to date by ADF&G and some dozen others are being processed. One of the big hang-ups occurs in the long period of time it takes to obtain a land use permit when the hatchery site occurs on public land which it is most likely to do in Southeast Alaska, as it is nearly all National Forest land. Like the state agencies, the federal bureaucracies have been trying to catch up in developing policies and specific procedures to serve this new natural resource user and producer industry. Such government changes take time because of new demands on budget, personnel, etc. This year has already seen that early period of uncertainty coming to a close and as

federal and state agencies gain experience with the program they will begin to refine and thus speed up the procedures which have frustrated the early pioneers in this endeavor.

After the permit hurdles are overcome, the next big problem is initial financing to get a hatchery started. Those people with public land sites are obviously starting from scratch and planning facilities in remote areas means high construction cost, even for pilot projects. Since it is public land with no physical facilities, there is no collateral of the usual type to offer to qualify for money from the revolving state loan fund specifically set up for private non-profit salmon hatcheries, unless the applicant has other resources to offer. Usually he does not or he wouldn't be seeking a loan in the first place. Some applicants thus feel that the $200 million state loan fund is an inaccessible carrot that leads them on but does little to stimulate the developing private hatchery industry. As usual, there are two sides to the story. The state Commerce Department rightfully points out that the loan fund is public money and it is their duty to distribute it carefully with some assurance of its being repaid just as a bank would require. Also, with a low interest rate like 6% and no payments or interest charged for the first six years, it is unquestionably the most liberal loan one could get for this type of high risk venture. The applicant replies that this is indeed a high risk venture because the hatchery salmon are turned loose for anyone to catch in the common property fishery and therefore there should be special consideration for this contribution to the fishery in the form of liberalizing the collateral requirements. In point of fact, it has been reported that additional legislation will be introduced this year to offer some form of a debt forgiveness plan for hatchery operators. Whether this eases the initial financing or collateral requirements remains to be seen.

Harvesting procedures for returning hatchery fish must be worked out at least on a trial basis among ADF&G, commercial fishermen, and hatchery operators within the next six months, as two sites, Sheldon Jackson College and Prince William Sound Aquaculture Corporation in Cordova, are expecting their first returns in August. These could either set some important precedents or at least provide information for management of other sites in the future. It would appear the crux of the matter revolves around the involvement of commercial fishermen in the overall non-profit salmon hatchery program. This program was originally designed by fishermen, for fishermen, but we have not yet achieved the "of" fishermen. It has happened in Prince William Sound where fishermen's voluntary pledges of financial support have even been accepted by the Alaska Commerce Department as collateral for building and operating the San Juan hatchery. Some form of similar fishermen involvement must occur in Southeast Alaska to give this program a solid basis for its existance and operation. Geographic and user group diversity make organization more complicated in Southeast Alaska but this area also contains the greatest potential for hatchery development because of its favorable climatic and water resources.

Against this current background, the SJC Hatchery Technician Training Program is going forward in the belief that salmon enhancement in Alaska is progressing through a normal and healthy state of development. Physical facilities are being increased to provide the necessary self-sustaining production level. This production will serve as a training tool and provide the basic economic support to achieve our primary program objectives.

Program Objectives

The program objectives remain as originally formulated:

1. To promote Native Alaskan education by providing an educational career ladder for Indians, Eskimos and Aleuts, so that what they learn can be applied to a practical and meaningful vocation.
2. To enhance salmon stocks by establishing a private hatchery on campus to produce fish for the common property fishery and as a source of self-sustaining funds for the program.
3. To promote cooperation among public and private organizations involved in the development of salmon ranching.
4. To provide technical assistance and advice to Native and non-Native corporations and individuals by sharing our own experiences and the knowledge gained from others.

Advisory Program

Over the past two years, a Technical Advisory Committee has helped guide our program direction. Dr. William McNeil serves as chairman. (See Appendix C for current committee membership). This committee meets on the SJC campus each November and May to evaluate progress and suggest new goals. (See Appendix D for Chairman's Report of the November 1976 meeting). The next meeting is tentatively scheduled for May 17, 1977. This fall, representatives from the first and second year technician students were added to the advisory board.

Program Staff

The following staff members are responsible for carrying out the program objectives: Mel Seifert, Director, is in charge of all operations. Dennis Lund, Production Manager, is responsible

for expansion of hatchery facilities, hatchery production, and marketing of returning adults; Mack Cook, Instructor, is responsible for continued development and teaching the academic curriculum. David Bright, Aquaculture Supervisor, is in charge of the operation and maintenance of the hatchery, weir sites, and work crews; Gabe George, Teaching Assistant, is responsible for assisting and teaching of hatchery courses; Cathy Hanson is Administrative Assistant and Program Secretary.

Program Progress

This report covers the fifth sixth month period of the Aquaculture Program and relates the beginning of the second hatchery cycle and academic year. Specific program objectives are outlined in the timetable developed for the second grant application to the Northwest Area Foundation (See Appendix E). The current activities are presented here under the topics of our primary objectives:

1. Planning and Coordination
2. Academic Program
3. Advisory Services
4. Aquaculture Facilities

Planning and Coordination

Three areas of activities will be described under this section:

1. Educational Programs
2. Student Recruitment and Program Publicity
3. Funding Sources

Educational Programs

July 1	Several SJC students employed as summer assistants in hatchery.
July 5	SJC summer work volunteers tour hatchery.
July 9	Dr. Elizabeth Tyler's summer school Psychology class tours hatchery.
July 10	Slide-lecture presented to SJC summer volunteers from Colorado and Wyoming.
August 17	Don Barrett, Career Coordinator of Tlingit-Haida Central Council, Don Rosenberg, Director of Alaska Sea Grant, and Clint Atkinson, U of A Fisheries Consultant visit SJC Hatchery.
August 24	Gabriel George accepts position as teaching assistant in program.
August 30	Hatchery technician students begin salmon spawning instruction.
September	Students help take approximately 2 million pink salmon eggs, 200,000 chum salmon eggs, and 25,000 coho eggs. Begin their own model incubators. Four students hired for fall semester to help operate and maintain hatchery, eggs, fish, and facilities.
September 13	School registration, 19 in hatchery course.
October 13	Slide-lecture presented at public lecture series at Sitka National Historical Park.
October 14	Ken Thompson and Jim Doyle of the United States Forest Service visit hatchery and discuss site criteria on National Forest land.
October 19	Mark Jacobs Jr., Director, SEALASKA, takes SJC Aquaculture Program brochures to Alaska Federation of Natives conference in Anchorage.
October 20	Sitka elementary school fourth grade class tours hatchery and given slide-lecture.
October 21	Slide-lecture presented at Sitka High School Oceanography class.

October 26-29	Seifert and Dave Turcott, Biology Instructor, attend the Marine Science Educators National Conference at Pacific Grove, California. Seifert presents slide-lecture on SJC and aquaculture in Alaska and becomes member of the National Committee on Marine Science Technical Vocational Education. Turcott presents bid to host regional conference at SJC in May 1977 and offer is accepted.
November 2	Report to SJC faculty and staff on program progress.
November 10	Fisheries Science class observes ADF&G coho salmon fry trapping study at Starrigavan Creek in Sitka.
November 11	Seifert attends meeting of U. of A. Marine Advisory Program to discuss applicants for their Aquaculture Advisory Specialist position.
November 16	Sheldon Jackson College Aquaculture Program Technical Advisory Committee Meeting.
November 26	Mack Cook accepts aquaculture program instructor position funded by Sea Grant.
December 2-3	Gabe George presents SJC slide lecture program at the Land and Water Resources Instructor's Conference in Bethel.
December 7	Dennis Lund attends Sea Grant meeting in Anchorage to discuss the future direction of the Alaska Sea Grant Program in the area of Aquaculture research, education, and advisory services.
December 7-9	SJC hosts fish disease short course for private and state hatchery personnel, presented by ADF&G staff of the Fish Pathology Lab in Anchorage.
December 20	Sitka High School Oceanography class tours hatchery.
December 31	Dr. Richard Lee, MAP Education Specialist photographed aquaculture facilities at SJ to show students in Japan during his trip there in February.

The aquaculture facilities continue to develop as an educational tool for the Sitka community and visitors as well as SJC students. Completion of the sea water lab during spring semester should signal the beginning of a large potential for cooperative programs for the benefit of all educational institutions in Sitka, summer school students, marine short courses and visitors.

Slides taken for our own training purposes, of the SJ hatchery operation and students at work, have become popular with other agencies and publications. Certain slides of facilities and hatchery techniques have been loaned to the University of Alaska Marine Advisory Program for presenting aquaculture shortcourses and publications. ADF&G is planning a brochure for aquaculture applicants which may use some of our slides and several magazines preparing articles on Alaska aquaculture have requested use of our photographs.

As contacts with visitors, government and private agencies in our field continue to increase, so does the flow of available information to our students. The Sheldon Jackson College library continues to enlarge its fisheries related books and pamphlets and graciously seeks advice of our staff as to what should be added, subtracted, or maintained in its collection. The Aquaculture Program concentrates on building a collection of reprints and reference books maintained in the staff office, for the use of both staff and students. Duplicate material from either the library or program collection is offered to interested students rather than discarded.

Sea Grant Program

In the fall of 1976, the SJC Aquaculture Program was awarded a $57,000 grant through the Alaska Sea Grant Program. This money was to be used to bolster the educational rather than the physical support. A second instructor, Mack Cook, was hired to teach technician training and to develop areas of the curricula such as salmon nutrition and pathology. Mr. Cook joined the program in mid-December and prepared to begin teaching spring semester in February.

Sea Grant funds also allowed us to hire Gabriel George as a teaching assistant for fish husbandry courses and to be the primary instructor of fish biology during spring semester. He began his work in August assisting in salmon spawning instruction for the new students.

In addition to these new staff members, partial support money was available for some of the original staff members. This allowed some rescheduling of the initial budget to make up cost increases and additions to areas of high priority.

A small amount was asked for and granted for plankton sampling equipment. Dennis Lund will direct a student during spring semester in gathering data on our estaurine environment before and during the release period of our salmon fry. The items requested have been purchased.

The Sea Grant budget is attached as Appendix B. This grant is for one year of a three year requested project and is to be re-negotiated each year.

Student Recruitment and Program Publicity

The Director visited Dimond-Mears High School and the Career Center in Anchorage, as well as Sitka and Mt. Edgecumbe High Schools and a community conference in Wrangell. Gabe George presented our program in Bethel at a Resource Educators Conference and the high school there. Dave Nutting, Chairman of the Science Department, delivered an aquaculture slide-lecture to the school at Metlakatla. Russ Millette travels a great deal in his capacity as Director of SJC Admissions and recruits for our program as well.

Recruitment by the director and staff will continue through spring semester. Additionally, an announcement has gone out to all high schools in Alaska informing juniors and seniors of the opportunity for those interested in a fisheries career to apply for an expense paid trip to the SJC campus next August to observe and participate in the salmon spawning activities.

In addition to our many visitors, educational programs and regular recruitment activities, a new vehicle of publicity and student recruitment was initiated in September of 1976. Mrs. Cathy Hanson, who has been with this program almost from its inception, began editing the SJC Aquaculture Newsletter. This newsletter on program activities and general aquaculture news is sent to all Alaska high schools, the Technical Advisory Committee, and any other interested persons who request it. The response has been very good with letters of comment and questions from instructors and students in particular.

It is not known yet what effect the loss of state tuition grant money will have on student recruitment for the hatchery training program. The number of applicants to date is significantly less than last year at this time, but we have not been operating enough years to say for sure there is a direct cause and effect relationship or a normal fluctuation.

Funding Sources

In the spring of 1976, the Northwest Area Foundation refunded the SJC Aquaculture Program for the period of July 1976 to June 1978 in the amount of approximately $214,000. In addition to operational expenses for the hatchery and academic programs, this grant provided for expansion of the hatchery to a self-sustaining salmon production level and development of a seawater lab for multiple uses for biology and fisheries students.

In June of 1976, the director presented a proposal to the site visit team of the National Sea Grant Program. In August, notification was given by the Director of the Alaska Sea Grant Program that the site team had rated the presentation and program high on their list for funding. In November, when the Sea Grant fiscal year began, SJC was awarded a $57,000 grant to strengthen the educational portion of the aquaculture program. This allowed the addition of another instructor and a teaching assistant, as well as partial support for some of the original staff. The proposal was presented as a three-year project and will be re-negotiated each summer for the ensuing year.

The college has made a second grant proposal to the National Science Foundation Minority Institution Science Improvement Program, with Dave Turcott, Biology Instructor, as Grant Director. Within this proposal is a request for over $20,000 for hatchery construction monies. Although the grant has not yet been awarded, it appears at this time that it is being looked upon favorably.

In terms of long range funding, plans are now being laid for harvesting and marketing of salmon and/or eggs as first returns should begin in August 1977. Large returns are not expected

in 1977 and 1978 as large fry releases will not be possible until 1978 after the hatchery expansion is completed this year. Any income from these next two seasons can be stockpiled to provide operational income for the 1978-79 fiscal year.

The Fisheries Enhancement Loan Program provides a revolving loan fund for private non-profit salmon hatcheries. Low interest of 6% is not charged nor principal payments required for the first six years. Use of this fund by SJC is now being investigated.

Word was received in December from the Alaska Sea Grant Director that the National Sea Grant Program will initiate a Sea Grant Fellowship Program during fiscal year 1977. The program will provide educational and training assistance to qualified individuals at the undergraduate level in fields related to ocean and coastal resources. One year grants are made to colleges such as SJC and its staff would do the actual selection of recipients and administer the awards. We will certainly apply to participate in this program when it becomes active because educational funds for our potential student applicants is of primary concern at this time.

Academic Program

Of 29 students who "applied" for admittance to the program, 19 registered for Fish Husbandry class. By the end of fall semester 5 students had dropped the course. One or two students will not return next semester. This is a total likely attrition of 7 students. Of these 7, 2 decided they were not interested in aquaculture training, one was called home by his parents to help operate the family fishing vessel, one had financial problems, five had substantial academic problems which precluded their passing the course, so they were advised to drop it.

The remaining students were of a generally greater academic background than last years students. Three have bachelor's degrees and two more have had some college level classes elsewhere. This range of students in the class made teaching a challenge, but student interest, participation, and performance was very high and the report to the Advisory Committee by the student representatives was very favorable.

Students emphasized their desire for maximum hands-on experience to supplement lectures. The hiring of Mack Cook as an additional instructor will enhance the learning experience. Cook will teach the Fish Husbandry, Fish Biology, and Fisheries Science courses while Dennis Lund will teach Hatchery Practicum and Hatchery Projects as well as function as Production Manager during the hatchery expansion phase. Utmost effort will be made to involve students in hatchery construction and operation through the practicum class.

Last fall, 11 students participated in the pre-semester portion of the practicum and received excellent experience in trapping and spawning pink and chum salmon and stocking incubators. With

the increased size of the hatchery next fall, a larger egg take, and the high probability of a substantial return of hatchery pink salmon, pre-semester student participation will be even more extensive and in fact, essential.

Ongoing effort is being made to update and refine course work material. The additional instructor will enable the inclusion of more material in a third semester of fish husbandry, particularly in the area of fish nutrition and disease.

A certification process is being finalized for application this spring to students who perform satisfactorily in the fisheries related coursework, but as a result of their preference or academic background, do not complete the schools requirements for an Associate of Science degree. By this means, students have a record of achievement and qualifications after one and two years of schooling whether or not they obtain the A.S. degree.

Two students who entered the program in 1975, plan to transfer to the University of Alaska in Juneau next fall. One of last years students is at the University of Washington under an Indian Education Act scholarship, and one is in the top of his class at UAJ right now. The students benefited from the help of Gabe George, a Tlingit from Angoon, who was hired as a teaching assistant. George is an SJC and Western Washington State College graduate in Marine Biology. It was reported by the student representative at the November Advisory Board Meeting that students felt having Gabe George on the staff was an incentive to work harder. Of 11 first year students responding to a questionaire, three planned to attend the aquaculture program one year, five planned on two years, and three others were going on for further education.

Advisory Services

As stated in past reports, advisory services tend to blend in with other activities such as educational programs, publicity, etc. Rather than listing individual contacts, suffice it to say that letters and telephone calls continue to come in concerning advice on hatchery and educationally-related topics. The new newsletter has encouraged questions from junior high and high school youths as well as adults. Some of these questions are answered in the next newsletter issue and the remainder are answered to the best of our ability by letter.

As in the past, our main services revolve around the training of future employees for the aquaculture industry in Alaska, sharing our hatchery experience with all who request it and directing particular inquiries to government and private agencies when some specific expertise or advice is required that we cannot provide.

Two areas of potential development have surfaced in the past six months. Many high schools in the state are either developing or considering their own aquaculture program on a secondary level as part of a current biology curriculum or on a larger scale as a vocational prep course.

Secondly, inquiries have been received on the possible development by SJ of shortcourses on various aspects of hatchery training to be delivered on site or on the SJC campus. Both these trends have implications which merit serious consideration by our program staff and college administration as to the how and whereby of our involvement.

Spring Fry Release

Specific information on pink salmon releases was published in the last progress report. Approximately 1.6 million pink fry were released between March 24 and May 22. Of those, 30,000 were fin clipped for survival studies on Indian River home stream stock versus Katlian River donor stock and a cross between the two.

Approximately 65,000 chum salmon were fed Oregon Moist Diet for 36 days and grew from 1079/pound to 587/pound at release on June 28. Of these, 10,000 were fin clipped for survival study. Some 8,000 Indian River coho fry were fed for 65 days and grew to 424/pound, fin clipped and stocked in the upper reaches of Indian River on July 31 for a survival study to hopefully yield some data on carrying capacity of the current natural coho fry and yearling population.

Summer Work

Katlian Weir - Because of the washout in 1975, the components for the Katlian weir had to be rebuilt. The original design of wood pickets was replaced by conduit pipe for smoother water passage and less clogging by debris. The sections were also shortened in height from four feet to three feet as the weir location in Katlian is shallow and since imminent high water requires pulling panels, higher panels served no useful purpose. Original spacing between the pipe pickets was 1 1/2 inches as was the case with the square wood ones. However, it was found that the roundness of the pipe and its greater flexibility resulted in gilling or escape of some small pinks so the spacing was reduced to 1 1/4 inches.

Indian River Weir - The Indian River weir required no repair, was installed, but never used because of the very few salmon in the 1976 run.

Sage Trapping and Holding Facility - a tailrace weir and adult salmon holding area was created by using a backhoe to deepen and widen the original area of the hydro flume outlet. Several 55 gallon drums and stop logs incorporated into a rock dam served as a water depth control structure. The weir was made to be higher than the highest tide as this entire trapping and holding facility is an intertidal area. Holding pens were covered with screen tops fastened down during high tides. The entire facility worked well but will probably have to be enlarged for larger returning salmon run.

In Sage Building, additional rearing and incubation equipment was added; two more Heath incubator stacks, two 4' x 8' rearing boxes and experimental incubators. Later, several 3' and 4' high fiberglass tanks were added for maintenance of the chum and coho fry being reared for student experience. All this added to the technical instruction capability of this area to provide on-the-job type training for students during fall semester.

Experimental Incubators

Our proposed hatchery expansion will require an incubation system that can utilize vertical space so that more eggs can be put in a smaller horizontal area than now true for our shallow gravel incubators. However the shallow gravel style has proven reliable for our type of water supply which has silty conditions in the fall. Therefore, we began testing

A stacking system of shallow gravel, shallow box, horizontal flow incubators patterned somewhat after some of Chet Mattson's National Marine Fisheries Service work with incubation channel boxes. Loading densities at 20 fry/cubic inch is about the same as Netarts boxes but water flow is horizontal rather than upwelling. Current channels being tested with pink and chum eggs are 2' wide by 8' long and stacked 3-5 units high. The stacked pink and chum egg incubation boxes also have bottom valves at various points allowing oxygen analysis within the gravel in addition to samples taken from the overlying water column. A model incubation box made of clear plexiglass and capable of varying internal arrangements has been constructed so that water flow patterns can be studied with dye tests.

Two stacks of Heath incubators have been modified so that every other tray acts as a catch basin for fry that might emigrate from the tray above. These fry trays have various types of matrix materials and resulting movements may give some indication of matrix type influence on premature outmigration under similar conditions. The results of these various tests will be reported at the conclusion of the hatchery cycle in the annual report to Alaska Dept. of Fish and Game in June.

Sea Water Lab

During late spring and early summer, work was begun on a project separately funded under the current Northwest Area Foundation grant. A 600', 4" PVC water line and intake was established

from Sage Building into Crescent Bay. A pump in Sage basement pumps sea water through this line and up to a first floor area for displaying and maintaining intertidal and ocean sea life. Large plexi-lass aquaria and table supports were constructed during fall semester. A portion of the 30' x 50' room is utilized for students freshwater hatchery projects. A new cement floor will be poured for proper water drainage and plumbing and container arrangements completed during spring semester. Two aquaria and a water table are currently maintaining intertidal organisms, a few chums and coho salmon, and some small oysters donated by the University of Alaska's Seward Marine Station. This room, when completed, will be a very valuable instructional and visitor display area.

Fry Rearing

Approximately 3000 coho have been reared since June 1976 in 4' x 8' boxes in Sage basement. These fish are for student work experience and for release as smolts in 1977 for future brood stock. At the end of December, they were about 40/pound with negligible mortality during those 6 months. As our holding capacity increases we hope to be able to release more per year to add to the sport and commercial fish potential of the Sitka area.

Some chums were kept in freshwater tanks for student training as well as our own experience in rearing them. They have maintained well with only occasional mortality usually from a fungus infection on a wound and grew faster than cohos in the same length of time. By the end of December some 500 were 30/pound.

FALL OPERATIONS

Starrigavan Creek

The even year 1976 pink and chum runs in Indian River and Katlian River were very low so that it was neccssary to get our permit changed to get pink salmon eggs from Starrigavan Creek which had an abundant run and chum eggs from Nakwasina which had a limited run of that species. FRED Division has a weir and trapping facility on Starrigavan Creek for their coho hatchery and saltwater rearing pens and we were graciously allowed to use their weir for trapping pinks. We counted pinks past the weir from August 17 until enough had gone upstream to satisfry ADF&G Commercial Fish Division escapement requirements for natural spawning. Then, with student help, we spawned approximately 1.9 million eggs between September 1 and 10. The eggs were brought back to the hatchery unfertilized and crossed with Indian River males trapped at our Sage hatchery weir site. To mitigate the chances of transferring any possible fish pathogens from one hatchery stream to another, we treated all Starrigavan eggs with Wescodyne after water hardening, prior to incubator stocking. No serious incubation problems occured and hatching success in December was estimated at between 85-90%.

Katlian River

Runs of pinks and chums were too low to allow any egg take but our weir did operate on the South Fork of Katlian River in cooperation with ADF&G Commercial Fish Division. SJ provided the weir and ADF&G personnel erected and maintained it to count salmon and conduct adult spawner distribution and other studies. Toward the end of the season, high water washed out the weir and salvageable materials were later brought back to SJ.

Nakwasina River

Permission was granted by ADF&G to take 100 female chum salmon plus enough males to fertilize the eggs from Nakwasina Bay or mouth of the river by boat or beach seine. Large schools near the mouth of the river did not materialize so beach seining in the river intertidal area was undertaken first on September 19th. This showed us capture was quite possible but few were ripe. Rather than camp someone by the stream to hold females until ripe, it was decided to find a method of live hauling chums back to the Sage holding area. Several commercial seiners offered the use of their vessels with pumped water capability in their holds. However, it was found difficult to coordinate availability of fish and seiners during the fishing season. On September 26, beach seining produced 82 females and 58 male chums. These were put in floating pens 4' x 8' x 4' with lids and towed back to the Sage holding area by Dave Turcott and his troller, MARANATHA. The distance was about 14 miles and took roughly 7 hours at 2 mph. The chums lined up inside the cages and swam very nicely with no mortalities during the trip. They were spawned at Sage as they ripened and 77 females produced approximately 206,000 eggs. These eggs had over 95% eye up.

Indian River

The main river run was estimated at 150-200 pink salmon and although the weir was prepared, we felt the run was too small to justify removing any fish. No chum salmon were reported.

Hydroelectric Tailrace

The tailrace trap caught 186 pink salmon mostly males and 3 chum females. Approximately 61,000 Indian River pink salmon

eggs were taken from these tailrace fish. The chum females were spent. The pink males were used to fertilize the Starrigavan Creek eggs. Some 15 coho salmon were taken in the hydroelectric tailrace and another 13 in the overflow outlet of the hydroflume. This yielded about 4 good females with 15,000 eggs. Others were released.

1976 Egg Take

Final figures for the 1976 salmon egg take were thus:

Pinks	Indian River X Starrigavan	1,888,581
	Indian River X Indian River	61,083
		1,949,664
Chums	Nakwasina X Nakwasina	206,821
Coho	Indian River X Indian River	15,269

Personnel

Eleven students were able to arrive on campus early and received an intensive training in egg taking, transportation, disinfection, and stocking procedures over a two week period and as necessary thereafter. This year's students were hard workers, reliable, quick to learn and a pleasure to work with. During spring semester all the students will be working regularly in the hatchery as part of their practicum experience requirements. In addition, during the course of fall semester hatchery operation, we have had the opportunity to hire six of our trainees as part of a federally-supported work-study program.

During the summer, many volunteers who came to SJ to work for various lengths of time to aid the college in maintenance and operational activities, also accomplished much appreciated work for the hatchery program. Such work included repair of hydro flume, construction of Sage salmon holding area, cleaning gravel for incubators, modifying egg screens, painting inside Sage Building, installation of new windows on the first floor of Sage, and putting insulation and gravel around incubators. This labor force helped to stretch the SJC budget dollar.

FUTURE HATCHERY AND ACADEMIC PLANS

Much activity is now underway in preparation for a potentially good salmon run including return of our first hatchery release this August. Should this brood stock source be sufficient, we will need the incubation capacity increased by then and approval of ADF&G to take approximately 12 million pink salmon eggs to Sage to provide for an eventual 10 million fry release. Due to lack of brood stock and probable necessity of a donor stream source, the request for chum salmon eggs will remain at 1 million.

Hatchery expansion plans are being finalized and certain basic features are already under construction. Stacked incubators will be the likely system of increasing space efficiency. Evaluation of current prototype will determine best design within the incubation boxes. It appears at this time that a combination at Sage Building, a former sawmill next to Sage, and cement open air facilities will be used to provide the necessary incubation space. Additional water supply must be piped in to these various locations and two points of origin for this supply are now being compared.

The tailrace holding area will be enlarged to maintain more adults necessitated by the logistics of eventually having to handle some 10,000 spawners including males for maximum egg production.

In the administrative realm, work continues on the development of a five year plan for all salmon enhancement projects, planning for harvesting and marketing with input from commercial fishermen, discussions about research and development we are capable of performing, either on our own, or by contract subject to input and approval of ADF&G , long term operational budgeting, student recruitment, financing, and employment, sources of supplemental income until hatchery production is self-sustaining, assessment of capabilities and extent of advisory services just to mention a few.

ACKNOWLEDGEMENTS

Many thanks are due each year to many agencies and individual people without whom a fledgling operation would have a difficult time of getting its feet on the ground.

The Northwest Area Foundation has provided the bulk of our financial support for 2½ years now. Alaska Sea Grant, Don Rosenberg, Director, has added financial help in the program's educational sector with staff support. The Sheldon Jackson College administration in a year of financial re-adjustment has not wavered in its firm commitment to the program.

State and federal agencies continue to cooperate and advise with obvious concern for our eventual success. A list of people in this area would be long but we want to make particular mention of the strong support by Jim Parker, Commercial Fish Division, ADF&G, and Brad Sele and Harold Zenger, FRED Division, ADF&G.

Commercial and sport fishermen through organizations such as SEATA and the Fish and Game Advisory Board contribute important social-political experience acquired through many years of participation in a salmon industry without private hatcheries. Dave Turcott has donated the services of his troller, Maranatha, many times when a large power vessel was needed for hatchery functions. Carl Kerr and Charles Carlson offered use of their seine boats if needed to round up brood stock. Native organizations such as the Alaska Native Brotherhood, Tlingit and Haida Indians, and SEALASKA support SJC and the hatchery training program and encourage their people to consider salmon propagation as a

possible career choice.

A special mention needs to be made of the many long-term and summer volunteers who give of their time and abilities each year to SJC. The hatchery program has benefited greatly from their services.

To all these people and to many not mentioned simply for the sake of brevity, we say thank you.

Appendix A

Financial Report for July 1 to December 31 1976 - Northwest Area Foundation

		Budgeted	Spent	Balance
I.	Salaries	57,000	26,011	30,989
	Staff and Students Benefits	7,050	6,279	771
II.	Travel	6,435	2,470	3,965
	Staff, students Consultants, High school			
III.	Supplies & Services			
	Instruc. Material			
	Office, Phone	3,600	1,260	2,340
	Printing	2,300	300	2,000
IV.	Equipment			
	Seawater Lab	17,520	8,900	8,620
	Incubation Expansion	19,050	1,368	17,682
	Other	8,800	3,460	5,340
V.	Misc. from 74-76	4,514	3,982	532
VI.	SJC Matching	15,000	0	15,000
	TOTAL	141,269	54,030	87,239

Appendix B

Financial Report for September 1 to December 31, 1976 - Sea Grant

I.	Salaries	39,300	8,126	31,174
	Benefits	5,895	689	5,206
II.	Travel	3,000	300	2,700
III.	Supplies & Services			
	Office	500	48	452
	Printing	500	0	500
IV.	Equipment	1,350	748	602
V.	Indirect Costs	7,000	1,750	5,250
		57,545	11,661	45,884

Appendix C

TECHNICAL ADVISORY COMMITTEE

Revised Membership

Chairman:

Dr. William McNeil
General Manager
Ore-Aqua Foods

Representative
Metlakatla Island Res.

W.I.(Bob) Palmer, Director
Alaska Fisheries Council

Donald Barrett
Career Education Coordinator
Tlingit and Haida Indians

Peter Azure, Director
Native Studies Program
Sheldon Jackson College

Richard Eliason
State Representative

Ross Soboleff, Director
Office of Development Planning
Tlingit and Haida Indians

Charles Osborne
Biologist
U.S. Fish and Wildlife Service

Mark Jacobs, Jr.
Board of Directors
SEALASKA Corporation

Chet Mattson
Research Biologist
National Marine Fisheries Service

Dr. Ken Leon
Biologist
Alaska Dept. of Fish and Game

Dr. Richard Neve
Coordinator of Shore Programs
Univ. of Alaska

Representative
Alaska Native Brotherhood

James Parker
Area Management Biologist
Alaska Dept. of Fish and Game

Edwin Scholz
Assistant to the President
for Advancement at SJC

Alan Otness
Administrative Assistant
Petersburg Fisheries Inc.

Dr. Richard Card
Division of Fisheries
Southeastern Senior College

Mr. Dexter Kyle
Southeast Alaska Trollers Assoc.

Ken Thompson
U.S. Forest Service

Martha Hoover
Student Representative
Fish Husbandry Class

William Stelzenmuller
Student Representative
Fish Husbandry Class

Appendix D

Chairman's Report

Fourth Technical Advisory Committee Meeting

November 16, 1976

The SJC Aquaculture Program remains on schedule in all areas vital for future progress and growth of the program.

Fry released in spring 1976 included 1,650,000 pink salmon and 65,000 chum salmon. Pinks were released unfed and chums were fed 36 days and released at about double their initial weight.

The hatchery was restocked with 1,949,000 pink, 206,000 chum and 16,000 coho salmon eggs in autumn 1976. The brood stock originated from nearby streams, since the natural runs to the hatchery stream were small. First hatchery fish are expected to return next summer.

Plans are being developed to expand the hatchery capacity from 2 million to 10 million eggs in 1977. Funds are presently available from the Northwest Area Foundation and SJC to finance most of the proposed expansion of hatchery facilities. The Foundation has also provided funds for a sea water laboratory as part of a $214,000 grant to SJC for the two-year period beginning July 1, 1976.

The Alaska Sea Grant Program has allocated $57,000 to support the aquaculture training program. The program now enjoys good cooperation from Sea Grant at the state and federal levels.

Prospects are good for a substantial returning run of pink salmon adults to the SJC Hatchery in summer of 1977. The college will develop a proposal for exclusive harvest rights which will be submitted to the Commissioner of Fish and Game.

Student response to the SJC Aquaculture Program exhibits continued improvement. Nineteen students entered the program in 1976 out of 27 approved applicants. Five have dropped out for various reasons, leaving a balance of 14 students presently enrolled. There is still some reluctance on the part of Native students to participate in the program, even though the College is making every reasonable effort to encourage participation by Native students. There were 7 Native students at the beginning of the school year and 4 at present.

Interest in salmon ranching continues to grow throughout Alaska. Several high schools are in the process of developing small salmon hatcheries at diverse locations such as Southeast Alaska, Prince William Sound, Shumigan Islands, and the Lower Yukon River.

Passage of a $30 million bond issue for public hatcheries will allow the Alaska Dept. of Fish and Game to construct at least 5 major facilities capable of producing up to 50 million juvenile salmon per facility. Alaskan voters also retained the Limited Entry law which should encourage the growth of regional, non-profit private hatcheries sponsored by commercial fishermen, processors, and other user groups. Continued failure of salmon runs in certain areas such as Southeast Alaska and Prince William Sound, should provide further stimulus for growth of private and public hatcheries in Alaska, creating a demand for hatchery technicians.

Student reaction to the SJC program is generally favorable. Student representatives on the Advisory Board provide a candid assessment of the program and pointed out certain areas that students would like to see modified and strengthened. The great majority of students entering the program are planning careers in salmon hatchery work. A few are using the program to enter advanced professional work in the wildlife field.

William McNeil, Chairman
Technical Advisory Committee

Appendix E

	Quarters 1st	2nd	3rd	4th	5th	6th	7th	8th
1.0 Planning and Coordination								
1.1 Schedule meetings of Technical Advisory Committee		X		X		X		X
1.2 Submit annual hatchery report to ADF&G				X				X
1.3 Evaluate academic and hatchery programs				X				X
1.4 Submit progress reports to NWA Foundation		X		X		X		X
1.5 Develop long range funding plans	X	----------	----------	X				
1.6 Develop orientation program for high school and college students	X							
1.7 Evaluate orientation program		X						
1.8 Develop plans for hatchery brood stock trapping facility	X	----------	X					
1.9 Develop plans for incubation building	X	----------	----------	X				
1.10 Develop salmon harvest procedures and submit to ADF&G	X	----------	----------	X				
1.11 Evaluate student recruitment program		X						
1.12 Evaluate adult salmon returns						X		

Criteria for evaluation

1. Adherence to proposed work schedule
2. Agency approval of hatchery operation review and harvest procedures
3. Evaluation of academic and hatchery program by technical advisory committee

	Quarters							
	1st	2nd	3rd	4th	5th	6th	7th	8th
2.0 Academic Program and Placement								
2.1 Evaluate academic program		X		X		X		X
2.2 Evaulate enrollment goals		X				X		
2.3 Evaluate placement service	X				X			
2.4 Establish on-the-job training programs		X----------X				X----------X		
2.5 Develop audio visual materials	X----------X							
2.6 Recruit students		X----------X				X----------X		
2.7 Initiate orientation program	X				X			

Criteria for evaluation

1. Adherence to proposed work schedule
2. At least 15 students enrolled in technician and transfer programs for each of second and third academic year
3. At least 10 high school students attending orientation program.
4. At least 75 per cent of graduates placed in aquaculture and fisheries related employment

3.0 Aquaculture Facility

		Quarters							
		1st	2nd	3rd	4th	5th	6th	7th	8th
3.1	Construct and operate weirs	X	--------X						
3.2	Evaluate rearing facilities for coho and trout	X	-----------	----------	----------X				
3.3	Construct hatchery brood trapping facility			X	----------	----------X			
3.4	Submit hatchery report to ADF&G				X				
3.5	Mark and release pink and chum salmon fry				X				X
3.6	Construct sea water lab	X	-----------	----------	----------X	----------	----------	----------	----------X
3.7	Construct incubation building				X	-------X			
3.8	Harvest surplus salmon					X			
3.9	Operate incubation equipment	X	-----------	----------	----------X	X	----------	----------	----------X
3.10	Feed and rear coho salmon fry	X	-----------	----------	----------X				
3.11	Release coho salmon fry				X				
3.12	Develop marketing program for surplus salmon	X	-----------	----------	----------	----------X			

Criteria for Evaluation

1. Adherence to proposed work schedule
2. At least 800,000 pink/chum eggs stocked and at least 80% of these released as fry
3. At least 1000 coho released as smolts.
4. At least 20,000 pink salmon released as marked fry.

	Quarters							
4.0 Advisory Services	1st	2nd	3rd	4th	5th	6th	7th	8th
4.1 Modify and expand information for dissemination	X							X
4.2 Demonstrate hatchery methods	X							X
4.3 Revise program brochures		X				X		
4.4 Provide advisory services	X							X
4.5 Provide seminars or workshops as opportunity arises	X							X

Criteria for evaluation

1. Number of requests for technical assistance
2. Number of visitations by constituents
3. Evaluation of advisory services by technical advisory committee.